(12) UK Patent Application (19) GB (11) 2 269 403 (13) A

(43) Date of A Publication 09.02.1994

(21) Application No 9216438.3

(22) Date of Filing 03.08.1992

(51) INT CL[5]
E04F 15/00

(52) UK CL (Edition M )
E1D DCG2 DF153 DLEQW2 D1074 D2132 D401

(56) Documents Cited
GB 1146527 A

(58) Field of Search
UK CL (Edition K ) E1D DF153
INT CL[5] A47G , E04F

(71) Applicant(s)
Adrian Wilson
40 Becklow Gardens, Shepherd's Bush, LONDON, W12 9HD, United Kingdom

(72) Inventor(s)
Adrian Wilson

(74) Agent and/or Address for Service
Urquhart-Dykes & Lord
91 Wimpole Street, LONDON, W1M 8AH, United Kingdom

# (54) Tactile floor for the partially sighted

(57) A floor structure 10 has an underfoot surface of foot discernable tactile projections 12 and is divided into four zones 14, 16, 18 and 20, radiating outwards from a reference point 30. The projections of each zone are of different shapes to those of the other zones. Each zone is sub-divided into regions 32 each of which has a uniform array of projections 12 of the same size. The uniform array of projections and the size of the projections change progressively from one region to another from the reference point 30. A visually impaired person may gain an understanding of their orientation and distance from the reference point by touch using their feet. Each zone may be of a different colour with the regions 32 within each zone being of varying shades of that colour from the reference point. The floor may be used where the partially sighted or blind need to know their position on it, e.g. a stage or sports arena.

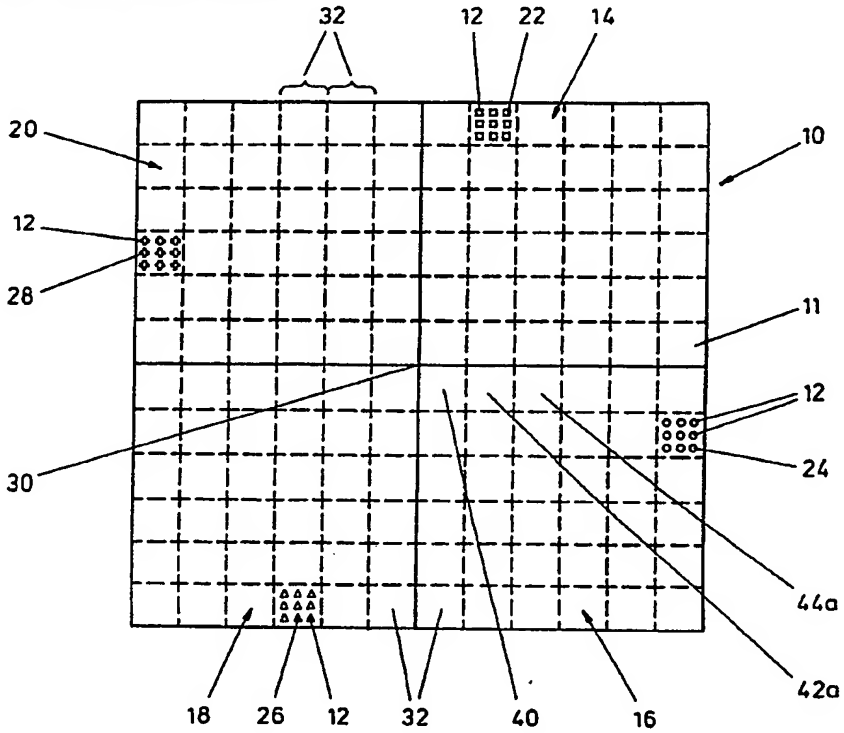


FIG. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

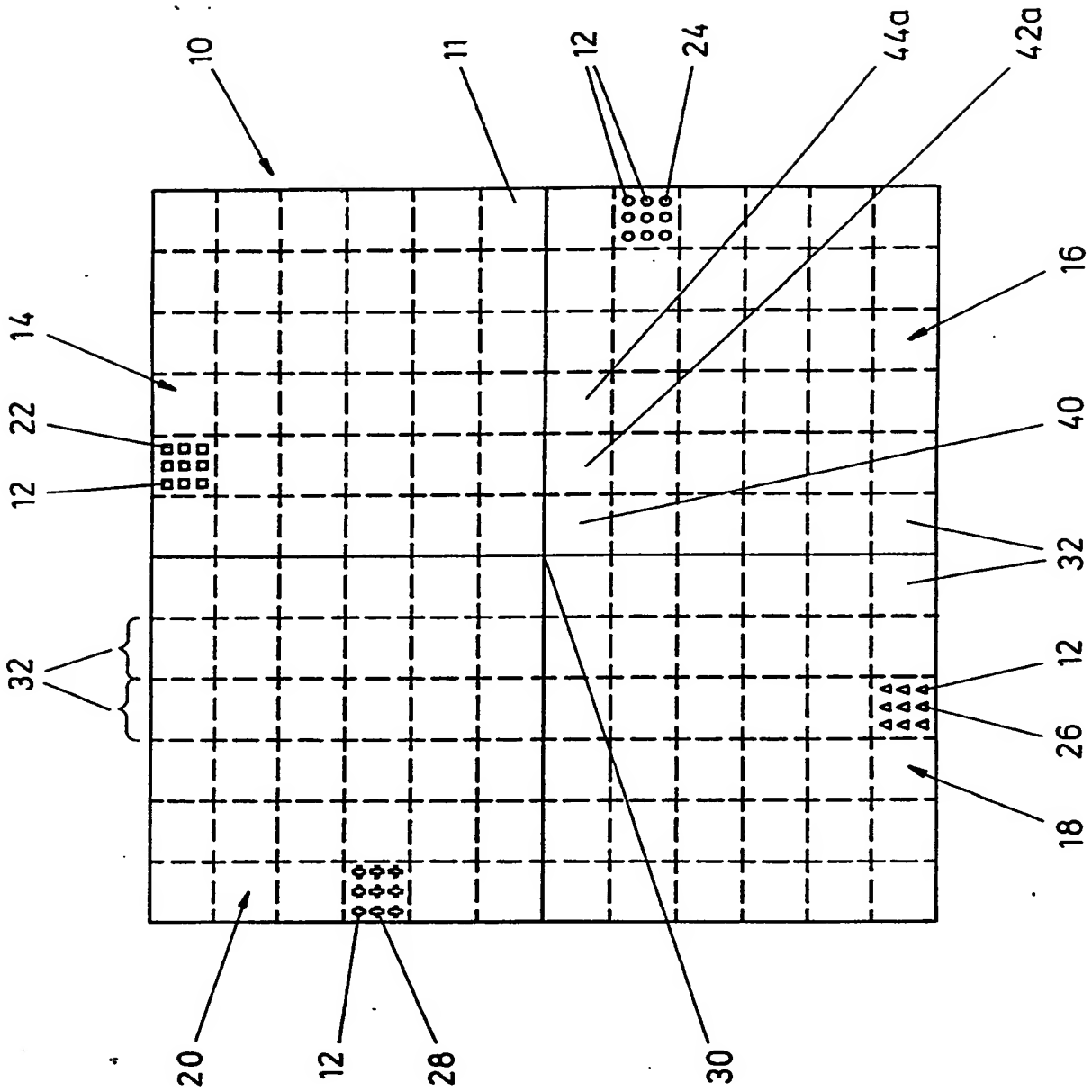


FIG. 1

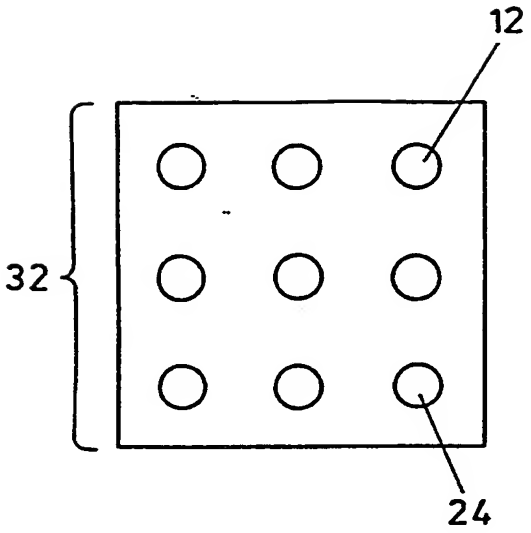


FIG. 2a

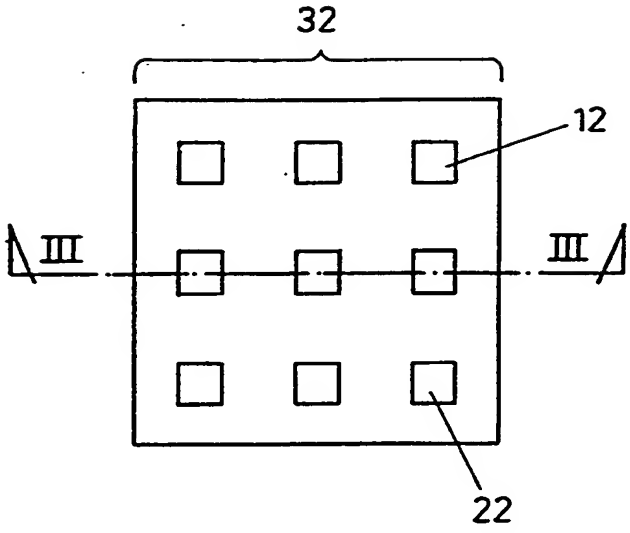


FIG. 2b

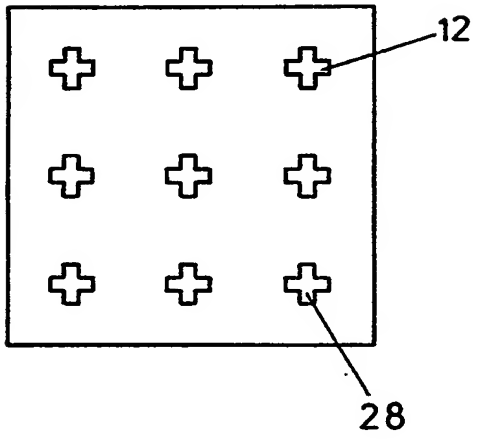


FIG. 2c

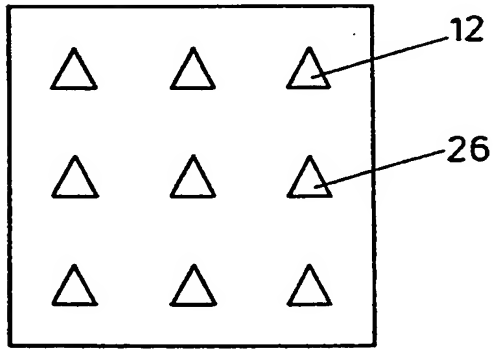


FIG. 2d

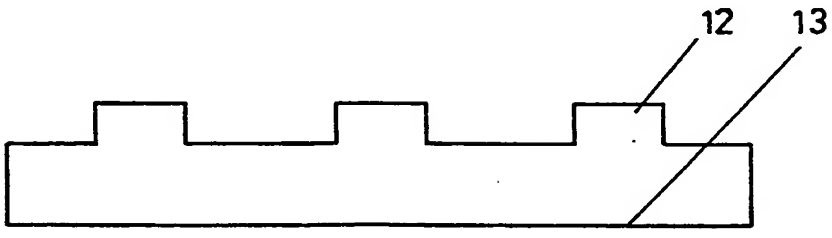


FIG. 3

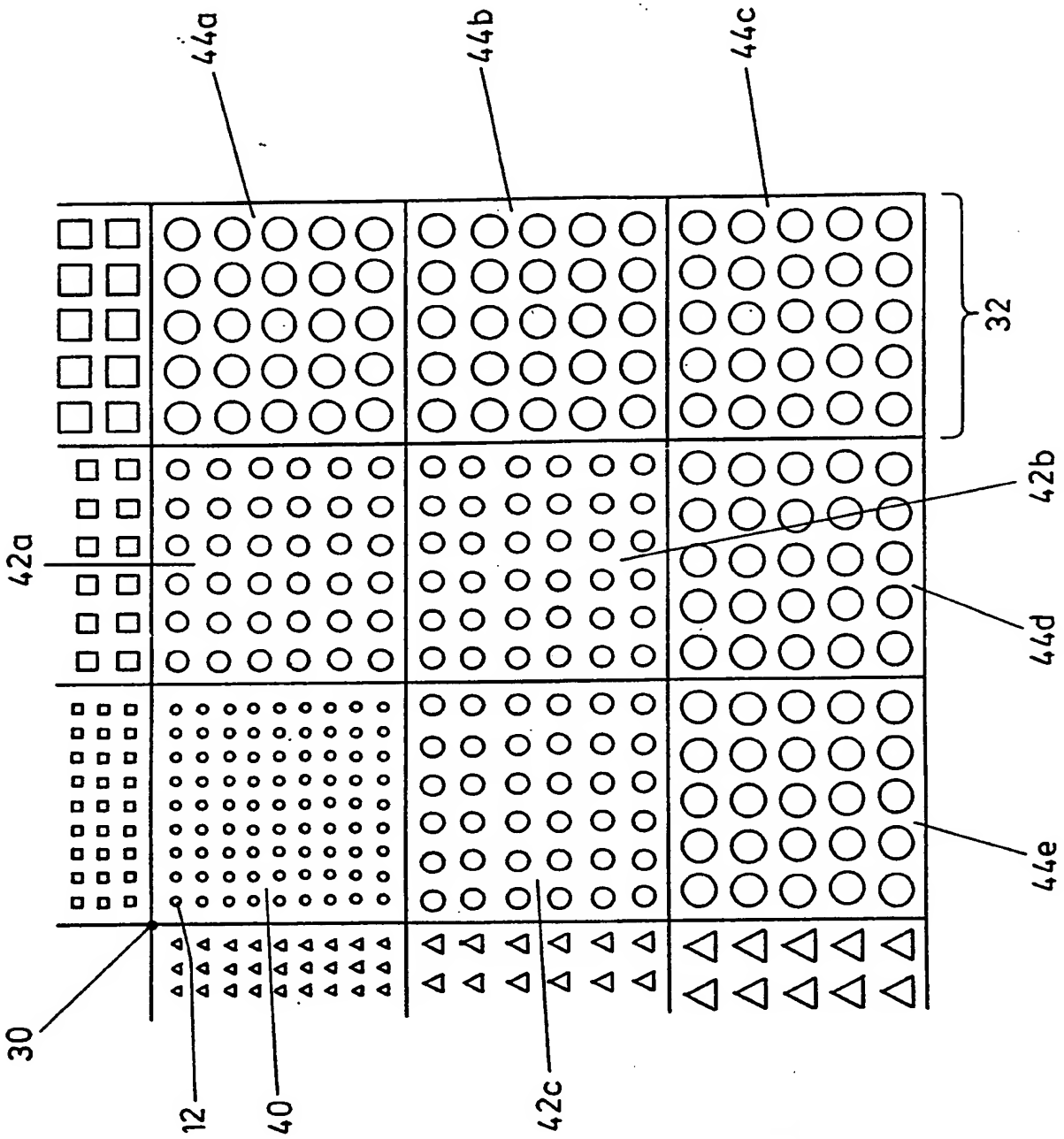


FIG. 4

# A FLOOR STRUCTURE

The present invention relates to a floor structure. More particularly it concerns a floor structure which is intended to provide means of sensing a position by touch. It is equally concerned with a floor structure having foot discernable tactile projections which may be used by blind or visually impaired persons to gain awareness of their position.

Such a floor structure is well known for indicating to blind and visually impaired persons the position of a controlled road crossing where rounded projections are found on paving stones.

While the known floor structure referred to enables visually impaired persons to determine the presence of a crossing there is no means for such persons to discern, from the floor, their orientation relative to the crossing or what distances may be involved from their particular location in moving to another location. It is an object of the present invention to provide a floor structure which alleviates the above mentioned problems.

According to the present invention there is provided a floor structure having an underfoot surface comprising a reference position and a spaced array of foot discernable tactile projections in which the surface is divided into zones disposed relative to the reference position, the tactile projections within each zone being of different shape to those of any other zone, and which zones are sub-divided into regions each having a uniform array of projections, in which the uniform arrays change progressively between regions as the regions increase in distance from the reference position.

The projections within a particular region are of the same size and the size of the projections in regions of a

particular zone may change progressively from one region to another as those regions increase in distance from the reference position. Preferably, each zone extends from the reference position of the underfoot surface.

The zones of the floor structure may be of different colours and, within each zone, the regions of different arrays of projections may be of different shades of the colour in a particular zone. Preferably, the shades of adjacent regions in a particular zone will change progressively to become lighter or darker as those regions increase in distance from the reference position. This is believed to be particularly useful for the partially sighted.

The floor structure will usually have at least three zones each of the same size and shape. Each said zone desirably having a boundary arranged so that the boundaries of all the zones coincide at the reference position, whereby the latter may be regarded as a point on the underfoot surface.

In a preferred form of the invention the underfoot surface is rectangular, usually square, and quartered into four zones of equal size, each occupying a corner of the floor, and has a reference point at the centre of the floor where the boundaries of all four zones are in contact so that each zone extends radially from the reference point. Preferably, each zone is sub-divided equally into, at least four, rectangular (usually square) regions each being of the same size and shape and all the zones of the floor have the same number of regions.

The floor structure preferably comprises a single mat. Alternatively, the floor structure may be made up of an arrangement of individual tiles or mats.

In a preferred practical application the floor structure provides a stage surface to facilitate performers determining their position and orientation on the stage.

One embodiment of a floor structure constructed in accordance with the present invention will now be described, by way of example only, with reference to the accompanying illustrative drawings in which:

Figure 1 shows a plan view, from above, showing the underfoot surface of the floor structure having four zones;

Figures 2a, 2b, 2c and 2d are plan views, from above, of a region from each of the four zones in the surface of figure 1 and which regions being equi-distant from a reference point;

Figure 3 shows a cross section along the line III-III of Figure 2b; and

Figure 4 is a plan view from above of a sequence of adjacent regions in the same zone of the floor surface of Figure 1.

A floor 10 is presented by a plastics moulded mat 11 for use as an aid for movement by visually impaired persons on a stage and having on an upper underfoot surface thereof tactile projections 12 which are foot discernable. The mat 11 is square and divided equally into four square zones 14, 16, 18 and 20. These four zones may represent the four regions of a stage, zone 14 being front left, 16 front right, 18 back right and zone 20 back left.

The tactile projections 12 of each zone are a different profile and shape as compared with those of the other zones. Zone 14 has square shaped projections 22 (Figure 2b), zone 16 has circular shaped projections 24 (Figure 2d), zone 18 has triangular projections 26 (Figure 2a) and zone 20 has cross-shaped projections 28 (Figure 2c).

Each zone has a square boundary and the position at which the boundaries of all the four zones 14, 16, 18 and 20 coincide forms a reference point 30 at the centre of the floor 10, from which the zones radiate. Each zone is sub-divided equally into square regions 32 of equal size. In a practical application

each region 32 is approximately 56cm square which is comparable to the length of an average human stride.

In a particular zone, the projections 12 are disposed in a similar array over all of the regions of that zone; further, the regions in the particular zone which are at the same distance from the reference point have their projections 12 disposed with substantially identical spacings and sizes while regions of different distances from the reference point have their projections disposed at relatively different spacings and sizes so that the projections vary in size and effective density, preferably progressively from one region to another in a zone over the underfoot surface, dependent upon the distance of particular regions from the reference point. This is seen in Figure 4 for the regions of zone 16 radiating from the reference point 30. In Figure 4 region 40 is adjacent to the reference point 30 and has a dense, uniform array of projections 12. The array of projections 12 in the adjacent regions 42a, 42b and 42c (further displaced from the reference point 30) are larger and become more spaced so that the distance between adjacent projections 12 in the uniform array increases. The projections 12 of the uniform array of regions 44a to 44e are larger still and even greater spaced than those for regions 42a to 42c. The spacing between adjacent projections in each region becomes even larger for those regions further away from the reference point 30. Similarly, the regions of the other zones have the same arrangement of projections, only the projections are of different shapes.

All projections 12 on the flooring 10 will usually (but not necessarily) be of constant height on the mat 11. In further embodiments of the invention the height of the projections 12 may be varied progressively from one region to another as the regions increase in distance from the reference point as a further means of varying tactile sensation to enable the visually impaired to determine their position on the floor.

Similar increases in projection cross sectional area and spacing occurs between the regions of the other zones 14, 18 and 20 of the mat for the different shaped projections.

Also, since visually impaired persons may have a greater visual awareness of colour than shape, each zone 14, 16, 18 and 20 is a different colour, zone 14 is red, zone 16 is yellow, zone 18 is blue and zone 20 is green. Furthermore, the regions with different arrays and projections within each zone are different shades of the particular zone colour; these shades may change progressively from dark shades at the regions adjacent to the reference point 30 to lighter shades at the regions furthermost from the reference point 30. For example in Figure 4 the region 40 would be a dark yellow in colour, with regions 42 a lighter yellow and regions 44 a still lighter shade of yellow.

The floor structure 10 is for use as a stage floor, the four zones 14, 16, 18 and 20 each representing one quarter of the stage and having different shaped foot discernable projections 12 so as to identify, by the sense of touch through the feet, in which area of the stage the person is standing. The flooring is further divided into square regions 32, of a size comparable to a human stride, in which the size and array of the zone projections changes as the regions increase in distance from the reference point such that by feeling, with the feet, how the array of projections change around the person it is possible to gain an understanding to the direction they are facing and their distance relative to the central reference point of the floor, enabling them to gain awareness of their relative position on the stage. Furthermore, the use of colour to identify the different zones and regions is to assist the partially sighted persons who are able to detect colour much more readily than they are able to detect objects.

Further embodiments of this invention include using a variety of different shapes for the projections of each zone

and varying the numbers of zones radiating from a reference point, which reference point not necessarily being centrally located in the flooring. Furthermore, the shapes and sizes of the zones and the regions may be different to those described (such as triangular zones with arcuate regions circularly radiating from the reference point), and more than one reference point used in the floor. Also a variety of colours may be used for the different zones or different colours used in the same zone for regions of different sized projections.

Although the flooring herein described is a single moulded plastics mat, the flooring could be constructed from individual moulded floor tiles or mats (or paving slabs) each tile representing a region, as described, having an appropriate array and size of projections. Tiles having different shaped projections and varying arrays may be laid to produce the required flooring, enabling floors of various shapes and sizes to be constructed to fit different areas.

The present invention may also be used with advantage in domestic and commercial applications, such as flooring for offices and schools, and may be used for safety purposes such as on ships and aircraft to give directional information to the visually impaired.

A further utilization of the present invention is in sport, especially athletics and gymnastics, where awareness of the athletes position can be essential. In such a use the floor structure may be constructed from large plastics moulded sheets or from plastics moulded strips having a desired array of tactile projections as discussed, and which, when not in use, could be easily rolled up for storage. Possible uses would include strips to form running lanes in athletics, giving relative information as to distance and which lane the competitor is in; sheets to form the floor surface used for floor exercises in gymnastics where the competitors will be able to determine their position relative to a reference point

and know where the edge of the competing area is; and strips to form run-up surfaces to allow the competitors to know when they are approaching a throwing line or jump off point.

Furthermore, use of the present invention is not restricted to use by the visually impaired but may also be utilized by persons with normal vision. One example being in fencing or judo where the floor used could comprise an array of tactile projections from which the competitors could determine their relative position without having to look away from their opponent or be distracted by uncertainty on where they are relative to the edge of the competitive area.

## CLAIMS

1. A floor structure having an underfoot surface comprising a reference position and a spaced array of foot discernable tactile projections in which the surface is divided into zones disposed relative to the reference position, the tactile projections within each zone being of different shape to those of any other zone, and which zones are subdivided into regions each having a uniform array of projections, in which the uniform arrays change progressively between regions as the regions increase in distance from the reference position.

2. A floor structure as claimed in claim 1 in which the tactile projections within a particular region are of the same size and the size of the projections in regions of a particular zone change progressively from one region to another as the said regions increase in distance from the reference position.

3. A floor structure as claimed in either of claims 1 or 2 in which each zone extends from the reference position.

4. A floor structure as claimed in any one of the preceding claims in which the different zones of the underfoot surface are of different colours to each other.

5. A floor structure as claimed in claim 4 in which the regions of different arrays of tactile projections of each zone are of different shades of the colour of that particular zone, the shades of adjacent regions in a particular zone changing progressively, to become lighter or darker, as the said regions increase in distance from the reference point.

6. A floor structure as claimed in any one of the preceding claims which has at least three zones, each zone being the same size and shape as the other zones.

7. A floor structure as claimed in any one of the preceding claims with each zone having a boundary, arranged so that the

boundaries of all the zones coincide at the reference position.

8. A floor structure as claimed in claim 7 in which the reference position is a point on the underfoot surface.

9. A floor structure as claimed in claim 8 in which the underfoot surface is rectangular and quartered into four rectangular zones of equal size and shape, each occupying a corner of the floor, and has a reference point at the centre of the floor where the boundaries of all four zones are in contact so that each zone extends radially from the reference point.

10. A floor structure as claimed in claim 9 in which the underfoot surface is square and quartered into four square zones of equal size and shape.

11. A floor structure as claimed in either claim 9 or in claim 10 in which each zone is sub-divided equally into at least four rectangular regions, each being of equal size and shape, and all zones of the underfoot surface having an equal number of regions.

12. A floor structure as claimed in claim 11 when appendant to claim 10 in which the zones are sub-divided into square regions of equal size and shape.

13. A floor structure as claimed in any one of the preceding claims in which the underfoot surface comprises a single mat.

14. A floor structure as claimed in any one of claims 1 to 10 in which the underfoot surface comprises an arrangement of individual tiles or mats.

15. A floor structure as claimed in any one of the preceding claims in which all the tactile projections are substantially of the same height.

16. A stage surface comprising a floor structure as claimed in any one of the preceding claims.

17. A floor structure substantially as herein described with reference to the accompanying illustrative drawings.

**Patents Act 1977**
**Examiner's report to the Comptroller under Section 17 (The Search Report)**

Application number
GB 9216438.3

**Relevant Technical fields**

(i) UK Cl (Edition K ) E1D DF153

(ii) Int Cl (Edition 5 ) E04F A47G

**Databases** (see over)

(i) UK Patent Office

(ii)

Search Examiner
J D CANTRELL

Date of Search
2 NOVEMBER 1992

Documents considered relevant following a search in respect of claims 1-17

| Category (see over) | Identity of document and relevant passages | Relevant to claim(s) |
|---|---|---|
| X | GB 1146527 (BANNER) | 1-10, 14,15 |

| Category | Identity of document and relevant passages | Relevant to claim(s) |
|---|---|---|
| | | |

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X: Document indicating lack of novelty or of inventive step.

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P: Document published on or after the declared priority date but before the filing date of the present application.

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